Fisheries and Oceans Canada | Pêches et Océans Canada
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National Capital Region
Canadian Science Advisory Secretariat
Science Response 2010/011

EVALUATION OF NARWHAL WITH RESPECT TO MAKING A CITES NON-DETRIMENT FINDING

Figure 1. Narwhal (Monodon monoceros) by R. Phillips.

Context

The *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES) is a legally-binding multilateral environmental agreement that aims to ensure that international trade does not threaten the survival of species in the wild. Canada is a Party to CITES and Fisheries and Oceans Canada (DFO) is the lead for related aquatic issues.

The narwhal (*Monodon monoceros*) is listed on Appendix-II of CITES. As is required under the Convention, an export permit shall only be granted when the Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of the species in the wild. This determination is referred to as a non-detriment finding (NDF). On October 14, 2010 at the request of the DFO CITES Management Authority, the CITES Scientific Authority and other relevant scientific experts evaluated the sustainability of narwhal harvests with respect to making a CITES NDF. The Scientific Authority will consider this advice in the issuance of an NDF for narwhals harvested in Canadian waters in 2010.

Based on the information available, conservation concerns were identified for three narwhal management units: Admiralty Inlet, Northern Hudson Bay, and East Baffin Island. Owing to the paucity of data available for the Parry Channel, Jones Sound, and Smith Sound management unit, the sustainability of current harvest levels cannot be verified. There are no apparent conservation concerns at the present time for the Somerset Island and Eclipse Sound management units.

Background

The *Convention on International Trade in Endangered Species of Flora and Fauna* (CITES) is a legally-binding multilateral environmental agreement that aims to ensure that international trade of species does not threaten their survival in the wild. In Canada, CITES is implemented through the *Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act* (WAPPRIITA). Environment Canada is the lead for CITES in Canada; however, Fisheries and Oceans Canada (DFO) is the lead for CITES-related aquatic issues.

The narwhal (*Monodon monoceros*) is listed on Appendix-II of CITES. As is required under Article IV, paragraph 2 of CITES, an export permit shall only be granted when the Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of the species in the wild. This determination is referred to as a non-detriment finding (NDF) and is not subject to socio-economic considerations. Export is not considered detrimental to the survival of a species in the wild when the products intended for export have originated from a sustainable harvest.

This Canadian Science Advisory Secretariat (CSAS) Science Special Response Process (SSRP) provides science advice regarding the sustainability of Canadian narwhal harvests with respect to making a CITES NDF. The Scientific Authority will consider this advice in the issuance of an NDF for narwhals harvested in Canadian waters in 2010.

Analysis

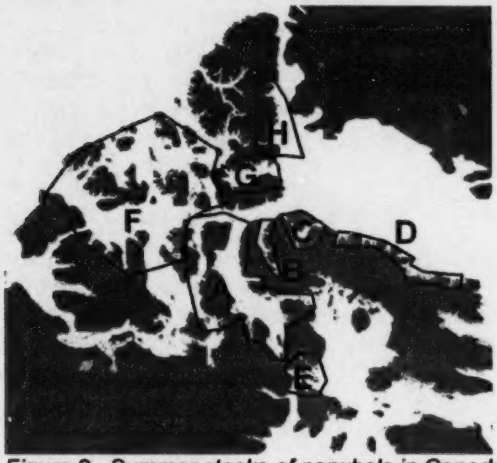
Justification for the Delineation of Narwhal Management Units

Scientific surveys conducted in various areas of the Canadian High Arctic from 1996 to 2010 indicate that the summer range of narwhals is vast and is comprised of approximately 80,000 individuals. Scientific research has focused on determining stock abundance and discrimination. Research studies have considered Traditional Ecological Knowledge (TEK) referred to as *Inuit Qaujimajatuqangit* (IQ) by Inuit, where available.

Two narwhal populations are recognized in Canadian waters: the Baffin Bay population and the Northern Hudson Bay population; the latter of which is considered genetically distinct. Information obtained via genetic and contaminant analyses, tagging programs, IQ, and research surveys, indicates that the Baffin Bay population is comprised of at least four summer aggregations (i.e. Somerset Island, Admiralty Inlet, Eclipse Sound, and East Baffin Island). Despite preliminary indications of some population structuring, at the present time it is unknown whether any of the Baffin Bay summer aggregations are genetically distinct. In addition, narwhals are also present in Parry Channel and the Jones and Smith Sounds. However, estimates of abundance for this management unit are currently not available and its relationship to the Baffin Bay population, as well as narwhals in Greenland, is currently unknown. The summer aggregation areas of narwhals in Canada are shown in Figure 2.

When managing harvests, summering stocks should be considered as separate management units to reduce the potential for local depletions and promote the conservation of genetic diversity that may result from adaptation to local conditions. Defining the Baffin Bay population into management units is considered precautionary; however in doing so the risk of over-

exploitation is reduced. Population estimates for each narwhal management unit are provided in Table 1.



A: Somerset Island
B: Admiralty Inlet
C: Eclipse Sound
D: East Baffin Island
E: Northern Hudson Bay
F: Parry Channel
G: Jones Sound
H: Smith Sound

Figure 2. Summer stocks of narwhals in Canada (DFO 2010a).

Recommended Harvest Levels

Recommended harvest levels for each management unit are based on the Potential Biological Removal (PBR) method and are presented as Total Allowable Landed Catch (TALC). The PBR and the resulting TALC are the preferred method when data are considered to be insufficient to conduct a full assessment. The PBR takes into account various sources of uncertainty (e.g. imprecision of population size estimates, growth rate, etc.). Canadian narwhal stocks often have only a single recent survey to assess population size, or data are considered insufficient to estimate population dynamic parameters. Therefore, DFO considers the PBR the acceptable approach to estimate sustainable harvest levels at the present time (Table 1). As hunting losses are difficult to quantify, average loss rates are applied to the PBR in order to calculate the TALC. Recommended harvest levels (TALC) are conservative and if respected should allow sustained catches into the future until there are sufficient data (e.g. via multiple index surveys and catch records) to conduct more detailed population dynamic assessments.

Narwhals may be hunted locally in their summer range and during the spring and fall migrations, resulting in the sharing of stocks among different communities within Nunavut and, in some cases, outside Nunavut. The proportion of harvests that occur during the spring and fall migrations cannot currently be attributed to a specific management unit and so catches are attributed to stocks close to the community where catches are reported.

Evaluation of the Sustainability of Narwhal Harvests

Each narwhal management unit was considered individually with respect to making a CITES NDF using available information regarding population estimates, recommended TALC, current quotas/harvest limits, and harvest levels for the past five years (Table 1).

Somerset Island
Narwhals are abundant in this management unit and harvest is considered sustainable as it is within the recommended TALC.

Admiralty Inlet
Given that the quota/harvest limit for this management unit is nearly five times greater than the recommended TALC, current harvest levels are considered unsustainable. The proportion of other management units harvested in the spring is unknown, as is the extent to which other communities are harvesting from this management unit at different times of the year. Although a new survey was conducted in 2010 and its results may lead to a revised population abundance estimate, those data are not yet available and cannot be taken into consideration in this assessment.

Eclipse Sound
Although it is possible that narwhals from this management unit are harvested in other locations, the quantities are unknown. However, as the quotas/harvest limits are well within the recommended TALC and this stock is considered abundant, there are no apparent conservation concerns for this management unit based on the information available.

East Baffin Island
The quota and harvest levels are greater than the recommended TALC for this management unit; therefore current harvests are considered unsustainable. However, it is acknowledged that although approximately half of the summer harvest is taken from this management unit, an unknown proportion of animals may be harvested from other management units during the spring and fall migrations.

Parry Channel, Jones Sound, and Smith Sound
Harvests from this management unit are considered opportunistic, no population estimates exist, and a TALC cannot be estimated. The relationship between narwhals in this management unit with those in Baffin Bay and Greenland is currently unknown. In addition, it is possible that this stock is also harvested to an unknown extent by Greenland (but probably not elsewhere in Canada). Owing to the paucity of data available for this management unit, the sustainability of harvest levels cannot be verified.

Northern Hudson Bay
Current harvest levels are considered unsustainable as they exceed the recommended TALC.

Conclusions

Based on the information available, conservation concerns have been identified for the following narwhal management units:

- Harvests in Admiralty Inlet are nearly five times greater than the recommended TALC;
- Northern Hudson Bay and East Baffin Island have harvests are greater than the recommended TALC; and
- Owing to the paucity of data available for the Parry Channel, Jones Sound, and Smith Sound management unit, the sustainability of current harvest levels cannot be verified.

Based on the information available, there are no apparent conservation concerns at the present time for the Somerset Island and Eclipse Sound management units.

Recommendations

- Align the quotas/harvest limits for each management unit with the science advice (i.e. recommended TALC) as soon as possible to reduce the likelihood of local depletions.

- Develop and implement an appropriate, comprehensive management plan to ensure sustainability of narwhal harvests in Canada. In particular, it is highly recommended that quotas/harvest limits be distributed and managed according to the management units defined above rather than by community.

- Obtain baseline information for the Parry Channel, Jones Sound, and Smith Sound management unit to aid in determining the sustainability of harvests in this management unit. In addition, increase the frequency of scientific surveys and continue data collection, including IQ, for all management units to improve confidence in the recommended TALC.

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Table 1. Synopsis of available information for Canadian narwhal management units.

Management Unit (Population Name[1]) *(DFO 2010a, Richard 2010)*	Last Surveyed	Abundance Estimate	Science advice re: Harvest Limits[2]	Current Quota/Harvest Limit[3]	Current yearly harvests: 2005-2009 (total for all communities)	Comments: All communities receive a corresponding number of DFO hunting tags for their quota/harvest limit. The Marine Mammal Regulations require that a DFO hunting tag accompany the tusk/skin/meat of all harvested narwhals. Under the Nunavut Land Claims Agreement, the local Hunters and Trappers Organization is responsible for tracking harvest data and regulating their hunters (e.g. some communities have developed hunting bylaws regulating their hunters as to how the hunt is conducted). When issues arise (e.g. over harvest), DFO Fishery Officers get involved. DFO Fishery Officers monitor some of the floe edge hunts and open water hunts.
Somerset Island Stock (BB Population)	1996	45,358 (SE=15875, CV=25%) *(Innes et al. 2002)*	PBR[2] – 681 TALC[2] – 532 *(DFO 2008)*	Igloolik – 25 Kugaaruk – 45 Taloyoak – 15 Gjoa Haven – 15 Resolute Bay – 32	2005 – 57 2006 – 137 2007 – 45 2008 – 48 2009 - 64	High Arctic narwhal were surveyed between 2002-2004; however a substantial part of the known range of the Somerset stock was not surveyed. The proportion of migrating Somerset narwhal harvested by Arctic Bay, Pond Inlet and Hall Beach hunters is not known.
Admiralty Inlet Stock (BB Population)	2003[4]	5,362 (SE=2681, CV=50%) *(Richard et al. 2010)*	PBR[2] – 36 TALC[2] – 28 *(DFO 2008)*	Arctic Bay – 130	2005 – 131 2006 – 130 2007 – 127 2008 – 132 2009 - 129	It is currently unknown which stocks are harvested during the floe edge hunt (e.g. Parry Channel, Somerset Island or Admiralty Inlet) during the spring migration. The majority of the harvest used to be during the floe edge hunt but due to ice conditions, the open water hunt is now taking a larger percentage of the whales in Admiralty Inlet. It is probable that some Admirralty Inlet narwhals are harvested during their fall migration by Qikiqtarjuaq and Clyde River hunters. (Dietz et al. 2008, Richard unpublished).
Eclipse Sound Stock (BB Population)	2004	20,225 (SE=7285, CV=36%) *(Richard et al. 2010)*	PBR[2] – 301 TALC[2] – 236 *(DFO 2008)*	Pond Inlet – 130	2005 – 62 2006 – 87 2007 – 65 2008 – 72[5] 2009 - 44	It is currently unknown which stocks are harvested during the floe edge hunt (e.g. Parry Channel, Somerset Island , Eclipse Sound or Admiralty Inlet) during the spring migration and when the narwhal migrate to their wintering grounds in the fall.
East Baffin Island Stock (BB Population)	2003	10,073 (SE=3123, CV=31%) *(Richard et al. 2010)*	PBR[2] – 156 TALC[2] – 122 *(DFO 2008)*	Qikiqtarjuaq – 90 Clyde River – 50 Iqaluit – 10 Pangnirtung - 40	2005 – 127 2006 – 131 2007 – 130 2008 – 115 2009 - 144	It is currently unknown which stocks are harvested during the spring migration and when the narwhal migrate to their wintering grounds in the fall. The survey area did not include waters adjacent to Cumberland Peninsula, another known area of occupation. Genetic analysis of narwhal samples from Iqaluit and Pangnirtung cluster with Baffin Bay population.
Other putative stocks: Parry Channel, Jones Sound Smith Sound (BB Population)?	No estimates	Unknown *(JCNB 2009)*	None	Grise Fiord – 20	2005 – 1 2006 – 21 2007 – 20 2008 – 23 2009 - 5	Very little information is known about these putative stocks other than there are narwhal present in these areas. One or more of these stocks may be shared with Greenland. There are no estimates of stock size and genetic information is inconclusive. The proportion of narwhal from these putative stocks harvested by Arctic Bay, Pond Inlet and Resolute hunters is not known.

Northern Hudson Bay Population	2000[6]	Estimated in 2000 at 5053 (SE 2009) *(DFO 2008)*	PBR[2] – 73 TALC[2] – 57 *(DFO 2008)*	Repulse Bay – 72 Coral Harbour – 10 Chesterfield Inlet – 5 Whale Cove – 5 Rankin Inlet – 10 Cape Dorset – 10 Kimmirut – 10	2005 – 89 2006 – 97 2007 – 88 2008 – 30 2009 - 119	The majority of harvest is focused around the Repulse Bay area. Some Hunters from other communities will travel to the Repulse Bay area to harvest narwhal. While this stock is shared with Nunavik Inuit, there is currently no allocation to Nunavik Inuit. Future Nunavik allocation will originate within the PBR recommendation for NHB narwhal. Hall Beach quota (10) is mainly associated with the Baffin Bay (Somerset stock), but hunters have sometimes landed narwhal within NHB narwhal summer range. The proportion of NHB narwhal in the Hall Beach landed catch is unknown. Hall Beach reported a total catch of 3 narwhal in each of 2005 and 2006, and none since then.

[1] Two narwhal populations are recognized in Canadian waters: the Baffin Bay (BB) population is comprised of at least 4 summer aggregations which are considered management units; the Northern Hudson Bay narwhal population is also considered a distinct management unit.

[2] PBR (Potential Biological Removal) is a method by which the TALC was estimated after factoring in losses. TALC (Total Allowable Landed Catch) is derived from PBR as follows: TALC = PBR / (1-LR), where LR is the loss rate. Loss rates were derived from the narwhal community-based management (CBM) community reports (DFO 2008). TALC applies to the catch in the local summering and wintering areas and during migrations between those areas*.

[3] Some narwhal populations/stocks are shared by communities within and outside of Nunavut during annual migrations (DFO 2008)*. Quotas are listed for communities that are geographically associated with each population/stock. Some more distant communities are thought to have access to these narwhal populations/stocks during migrations. It is not yet possible to distinguish the proportion of transient (migrating) narwhals in individual community catches.

[4] - Admiralty Inlet was surveyed in August 2010. A peer-reviewed population estimate for Admiralty Inlet is anticipated by early 2012 at the latest.

[5] - Pond Inlet harvest for 2008 does not include a natural mortality of approx. 600 narwhals determined to be fatally entrapped by ice in Eclipse Sound in late November.

[6] - The 2008 survey of NHB narwhal was affected by problems with equipment, ice coverage, and unusual narwhal distribution. A new survey has been requested no later than 2011. FM is advised to use abundance information from the 2000 survey, i.e. a corrected estimate of 5,053 (SE=2009, CV=40%) which accounts for diving animals.

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